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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,341	07/09/2003	Richard Allen Day	END920010118US2 (IEN-10-5)	1504
26681	7590	01/25/2006	EXAMINER	
DRIGGS, LUCAS, BRUBAKER & HOGG CO. L.P.A. 38500 CHARDON ROAD DEPT. IEN WILLOUGHBY HILLS, OH 44094			BROWN, JAYME L	
			ART UNIT	PAPER NUMBER
			1733	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/616,341	Applicant(s) DAY ET AL.	
	Examiner Jayme L. Brown	Art Unit 1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 11 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-13, and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/21/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species A, *sub-species Aii*, claims 10, 12-13, and 15 in the reply filed on 11/2/05 is acknowledged. The traversal is on the ground(s) that 11 and 14 should not be excluded since they appear to be included in *sub-species Aii*. This is not found persuasive because claims 11 and 14 are part of *sub-species Ai* and are not included in *sub-species Aii*. Rejoinder of the claims would be considered upon indication of allowable subject matter and the basis thereof.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12/21/05 has been considered by the examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession

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of the claimed invention. According to the Specification, the first portion has a first roughness and the lands are roughened to form a second surface having a second roughness that is part of the second portion; therefore, the lands would not be part of the first portion of the signal plane as stated in the claim.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 6-10, 12-13, and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 6 recites the limitation "said surfaces" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is recommended that the claim be amended to state, - - a plurality of portions of said at least one signal plane surface - -.

b. Also regarding claim 6, it is unclear what roughness is meant by "said roughness". Clarification is required.

c. Regarding claim 7, it is recommended that "said plurality of surfaces of said signals plane" be changed to - - said plurality of portions of said at least one signal plane surface - - in order to correspond to the recommended amendment of claim 6.

d. Claim 8 recites the limitation "the first portion of said signal lines" in line 3. There is insufficient antecedent basis for this limitation in the claim. It is recommended that "said signal lines" be changed to - - said signal plane - -.

e. Regarding claim 8, lines 3-4, it is recommended that "a second surface with a surface roughness greater" be changed to - - a second surface with a second surface roughness greater - - in order to clarify the claim.

f. Also regarding claim 8, lines 4-5, "said first portion thereof" is unclear because it is unclear as to whether it is the first portion of the voltage plane or the first portion of the signal plane.

g. Regarding claim 9, it is recommended that "said first portion of said surface" be changed to - - said first portion of said at least one surface - - and "said second portion of said surface" be changed to - -said second portion having said second surface - - in order to clarify the claim.

h. Regarding claim 10, it is recommended that "said roughened surfaces" be changed to - - said second portion - - in order to clarify the claim.

i. Claim 10 recites the limitation "the copper surface" in line 3. There is insufficient antecedent basis for this limitation in the claim.

j. Claims 12 and 15 recite the limitation "said surface on said voltage plane" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended that "said surface" be changed to - - said second portion - -.

k. Regarding claims 12 and 15, line 5 of both, it is recommended that "those areas" be changed to - - unmasked areas - - to better clarify the claim.

l. Also regarding claims 12 and 15, as they are now amended, they are duplicate claims. It appears that claim 12 should be dependent on claim 1 and that "said voltage plane" in lines 2 and 3 should be changed to - - said signal plane - -.

m. Claim 13 recites the limitation "said roughened surfaces having said second roughness" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended that "said roughened surfaces having said second roughness" be changed to - - said second portion of said signal plane having a second roughness and said second portion of said voltage plane having said second roughness - - in order to better clarify the claim.

n. Claim 13 recites the limitation "the copper surface" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asai et al. (WO 98/27798; for English translation: U.S. Patent 6,835,895) in view of Chen et al. (U.S. Patent 5,156,710).

Regarding claim 1, Asai et al. teaches a method of laminating a circuit board comprising the steps of: providing a first layer having a dielectric material (1) having a conductive signal plane thereon (8), said signal plane having at least one surface with a first portion having a first roughness; forming said signal plane into signal lines (4) and

lands; thereafter selectively roughening at least a second portion of said at least one surface to form a second surface having a second roughness greater than said first roughness; providing a second layer (12) comprised of a voltage plane as a single sheet of foil disposed on a dielectric material; laminating said first layer to said second layer with adhesive therebetween to form a composite structure; said signal plane and said voltage plane being oriented toward each other; said composite structure being formed with plated through holes surrounded by lands (9) (Column 3, lines 13-55; Column 4, lines 55-67; Figures 1-8).

Asai et al. is silent toward the adhesive being a sticker sheet. Chen et al. is directed to laminating polyimide to thin sheet metal to make circuit boards (Column 1, lines 15-21). Chen et al. teaches bonding laminates using a film of thermosetting or intractable polyimide precursor. One skilled in the art would have readily appreciated using a film (sticker sheet) to bond the signal plane and voltage plane since it is a conventional technique in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use sticker sheet (film) in the method of Asai et al. as suggested by Chen et al. since it is known and conventional in the art.

Regarding claim 2, it appears that the claim should have the lands in the second portion; therefore, Asai et al. teaches having the second portion of the signal plane including the lands surrounding the plated through holes (9) (Figures 2-4).

Regarding claims 3 and 4, it appears that the roughness of the areas in Asai et al. meet the R_z values as claimed (Figure 4). Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the

claimed roughness, since such are only dependent upon the materials used, the thickness of the materials, and the desired bond strength, and only the expected results would be attained.

Regarding claim 5, the limitations are addressed above in claims 3 and 4.

Regarding claim 6, Asai et al. teaches that the signal plane has a plurality of surfaces with said roughness (Figure 4).

Regarding claim 7, Asai et al. teaches that the plurality of surfaces of said signal plane includes at least three surfaces (Figure 4).

Regarding claim 8, Asai et al. and Chen et al. are relied upon for the teachings above. Asai et al. is silent toward the voltage plane having a first portion with a first surface roughness and a second portion with a second surface roughness greater than the first. One skilled in the art would have readily appreciated using the same roughening method for the voltage plane as done above with the signal plane since the roughness provides the signal plane and voltage plane to be strongly adhered to one another and can control any cracks generated (Asai et al.: Column 5, lines 23-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a first portion with a first surface roughness and a second portion with a second surface roughness greater than the first in the method of Asai et al. since the roughened areas provide strong bonding and prevent cracks.

Regarding claim 9, it appears that the roughness of the areas in Asai et al. meet the R_z values as claimed (Figure 4). Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed

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roughness, since such are only dependent upon the materials used, the thickness of the materials, and the desired bond strength, and only the expected results would be attained.

Regarding claims 10 and 13, Asai et al. teaches that the second portion of the signal plane having a second roughness are roughened by treating the copper surface with an oxide or oxide replacement process (Column 8, lines 59-65; Column 9, lines 15-23).

9. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asai et al. (WO 98/27798; for English translation: U.S. Patent 6,835,895) in view of Chen et al. (U.S. Patent 5,156,710) and further in view of Tippner et al. (U.S. Patent 6,175,085).

Regarding claims 12 and 15, Asai et al. and Chen et al. are relied upon for the teachings above. Asai et al. is silent toward the second roughness on the voltage plane (or signal plane) being created by applying a masking material to all the areas of said voltage plane (or signal plane) that are not to have said second roughness, then roughening unmasked areas to have said second roughness. One skilled in the art would have readily appreciated using a masking material in order to prevent roughening of certain areas since it is a conventional technique used as shown, for example, by Tippner et al. The areas not covered by the masking material have an increased roughness (Column 3, lines 10-23; Column 4, lines 8-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a masking

material to prevent roughening of certain areas in the method of Asai et al., as modified above, as suggested by Tippner et al. since it is a conventional technique.


Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Jayme L. Brown** whose telephone number is **571-272-8386**. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jayme L. Brown


GLADYS J.P. CORCORAN
PRIMARY EXAMINER